

## DRAWINGS ATTACHED

1 204 423

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## (54) CATALYTIC OXIDATION UNIT

(71) We, MOFFATS LIMITED, of 23 Dennison Road East, Weston, Ontario, Canada, a company organized and existing under the laws of Canada do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:

10 The present invention relates to what might broadly be termed a catalytic oxidation unit which is useful in treating hot gaseous products to reduce smoke, odour and other undesirable properties present in the hot gases as they pass through the unit.

15 The invention has particular application to the vent for an oven in a cook stove which oven is of the kind in which food soil may be cleaned from the walls thereof by pyrolytic action at an elevated temperature.

20 In recent years, the cook stove industry has developed an oven wherein food soil may be cleaned from the oven walls by pyrolytic action which takes place under oxygen-starved conditions in a temperature range lying somewhere between 800°F and 1000°F. The pyrolytic action taking place within the oven under these temperatures is oxygen-starved combustion proceeding at a relatively slow pace and generating gaseous products which are vented from the oven through an appropriate passage.

25 The gaseous products formed in the oven are frequently incompletely oxidized and would emerge in the form of smoke and having, at least in some instances, an objectionable odour.

30 It is an object of the present invention to provide a device which will serve as a vent for the gaseous products developed during the pyrolytic oven cleaning cycle and which will complete the oxidation of the gaseous products as they pass therethrough so that the gaseous products emerge into the ambient atmosphere as a colourless, odourless gas.

35 It is a further object to provide a cook stove incorporating such a unit.

40 According to the invention there is provided a catalytic oxidation unit adapted to form an oven exhaust vent, comprising a substantially straight tube adapted to extend upwardly from the oven and allow escape of gases from the oven cavity therethrough, said tube being made of resiliently deformable material and being split in an axial direction so that its cross sectional size is resiliently adjustable, and including a catalytic oxidation element removably secured within the tube.

45 The present invention will be described in detail with reference to the accompanying drawings in which:

50 Figure 1 is a perspective view, partly cut away and partly exploded showing a catalytic oxidation unit constructed in accordance with the present invention, and

55 Figure 2 is a section view along line 2-2 in Figure 1 and showing the exploded components in the assembled position.

60 Referring now to Figure 1, the catalytic oxidation unit or smoke eliminator is shown in the environment of the upper portion of a domestic cook stove. Such a cook stove embodies an oven cavity which is defined by a liner, the upper wall of which is shown in Figure 1 at reference numeral 10. The oven liner is secured by a lap welded seam 11 to a front frame 12 which, together with a retaining panel 13 forms an insulating cavity and retains an insulating blanket 14 of glass fiber material or the like in a position surrounding the oven cavity. Although specific details of the stove construction are not directly relevant to the present invention, it is convenient to observe that the panel 13 is secured to the front frame 12 through the intermediary of an angle bracket 15. Panel 13 is provided with an up-

turned lip 16, extending continuously there-  
around so that the panel 13 is, in fact, a  
large, shallow pan. The front frame 12 is  
provided with a forwardly extending flange  
5 17 to which the rearwardly extending flange  
18 of the stove top assembly 19 may be  
secured. In a conventional manner, the stove  
top assembly 19 is provided with a plurality  
of apertures 20 which are adapted to receive  
10 burner pans 21 within which, in a conven-  
tional manner, are mounted heating ele-  
ments which, for convenience, are not shown  
in the drawings. The burner pans are pro-  
vided with a centrally disposed aperture, as  
15 shown.

The top wall 10 of the oven liner is pro-  
vided with an aperture 21 defined by a low,  
upstanding, peripheral wall 22 which is  
formed from the material of the wall 10  
20 when the aperture 21 is punched therein.  
Circumferentially spaced tabs 23 are pro-  
vided, integrally formed with the wall 22  
and the upper ends 24 of the tabs 23 are  
bent over, as shown, to partially extend  
25 across the opening 21 formed in the wall  
10 of the oven liner.

In vertical alignment with the aperture 21  
is an aperture 25 formed in panel 13, aper-  
ture 25 being also surrounded by a low peri-  
30 pheral wall 26. Apertures 21 and 25 which  
are in vertical alignment with one another  
are also in vertical alignment and co-axial  
with aperture 20 in the stove top assembly  
19.

35 A split tubular element 27 is provided  
consisting of a sheet-metal member formed  
into a cylindrical tube, having adjacent  
edges 28 and 29 simply abutting one an-  
other without being secured to each other.

40 The external diameter of the peripheral  
wall 22 is slightly less than the internal di-  
ameter of the tube 27 and the internal di-  
ameter of the low peripheral wall 26 is  
slightly greater than the external diameter of  
45 the tube 27 so that the tube 27 may, as  
shown, pass through aperture 25 and em-  
brace the wall 22 in the upper wall 10 of  
the oven liner.

Intermediate its ends, the tube 27 is pro-  
50 vided with annular ribs or corrugations.  
Specifically, an annular rib 30 is provided  
in a position such that when the tube 27 is  
in the position shown in Figure 1, it will lie  
immediately below panel 13 and, being lar-  
55 ger than the internal diameter of the aper-  
ture 25, will retain the tube 27 in position.

In order to insert the tube 27 into the  
structure shown in Figure 1, one of the  
60 edges 28 and 29 is pressed radially inwardly  
of the other edge and the tube is then  
squeezed so as to resiliently reduce its di-  
ameter so that it may be inserted through  
opening 25 in wall 13. As the tube 27 is in-  
serted, the lower end is allowed to resiliently  
65 resume its circular configuration so that it

may embrace the wall 22 and, once it has  
seated upon wall 10, of the oven liner, the  
upper end is then allowed to expand to its  
circular configuration so as to be retained in  
position by the interference between rib 30  
70 and aperture 25.

When the tube 27 has been inserted as  
shown in Figure 4, a catalytic oxidation ele-  
ment, of cylindrical configuration and of  
a cross sectional size to fit the internal cross  
75 section of tube 27, and indicated by re-  
ference character 31 is placed in the tube  
and allowed to slide to the bottom to be  
supported upon tabs 24 as shown in Figure  
2. 80

The catalytic oxidation element 31 while  
it specifically forms no part of the present  
invention, has been found to be satisfac-  
torily provided by a ceramic honeycomb  
85 material of the kind sold under the trade  
mark "TORVEX" by E. I. du Pont de  
Nemours and Company of Wilmington,  
Delaware, United States of America. This  
ceramic honeycomb material is pervious to  
90 the flow of gases from the interior of the  
oven. The catalytic oxidizing action of the  
unit 31 is provided by a platinum catalytic  
coating of a kind which may be obtained  
from Messrs. Johnson, Mathey & Co. Limi-  
95 ted, 73-83 Hatton Garden, London, Eng-  
land.

Both the ceramic material specifically  
identified and the platinum coating referred  
to, however, are illustrative of the kind of  
catalytic oxidation element which is con-  
templated and the present invention is not  
intended to be limited thereto. 100

The catalytic oxidation element 31 is re-  
tained in position by a spring clip 32 com-  
prising a spring member of generally U-  
105 shaped configuration having legs 33 and 34  
provided at their free ends, with tabs 35 and  
36. The "at rest" separation between tabs  
35 and 36 is greater than the internal di-  
ameter of the tube 27 and the tube 27 is pro-  
110 vided, as can be seen in both Figures 1 and  
2, with at least one and preferably two inter-  
nal annular grooves 37 and 38 into which  
tabs 35 and 36 may seat when the spring  
retaining clip 32 is in position. Two grooves  
115 37 and 38 are normally provided so that the  
tube 27 may be adapted to firmly retain an  
oxidation element 31 of at least two alter-  
native sizes.

From the foregoing description it will be  
120 apparent that a device of the kind described  
has been provided which is extremely simple  
in construction, economical to manufacture  
and which can be assembled in the sur-  
rounding structure of a cook stove with a  
125 high degree of simplicity.

#### WHAT WE CLAIM IS:—

1. A catalytic oxidation unit adapted to  
form an oven exhaust vent, comprising a  
substantially straight tube adapted to ex- 130

tend upwardly from the oven and allow escape of gases from the oven cavity there-through, said tube being made of resiliently deformable material and being split in an axial direction so that its cross sectional size is resiliently adjustable, and including a catalytic oxidation element removably secured within the tube.

2. A unit as claimed in claim 1, wherein the tube is a sheet-metal member formed into a cylindrical tube with adjacent edges abutting one another without being secured to each other.

3. A unit as claimed in claim 2, wherein the tube is provided with at least one radial projection for engagement with formations on the oven structure.

4. A unit as claimed in claim 3, wherein the tube is adapted to extend from a part provided in the upper wall of the oven liner, through a vertically aligned part in the upper retaining panel of an insulation cavity above the oven, and up to a co-axial aperture in the stove top assembly.

5. A unit as claimed in claim 4, wherein the catalytic oxidation element substantially coincides in cross sectional shape and size with the internal cross section of the tube, and is located adjacent the bottom end of the tube.

6. A unit as claimed in claim 5, wherein a spring clip removably secures the catalytic oxidation element in position, said spring clip being generally U-shaped, each leg thereof being provided with outwardly extending tabs engaging one of a plurality of

annular grooves provided in the internal surface of the tube.

7. A cook stove including an oven cavity, an oven liner, an insulating cavity, a stove top provided with burner pans, and an exhaust vent for the oven, said exhaust vent including a catalytic oxidation unit comprising a substantially straight tube extending from an aperture in the upper wall of the oven liner to an aperture in the stove top, said tube being made of resiliently deformable material and being split in an axial direction so that its cross sectional size is resiliently adjustable, and including a catalytic oxidation element removably secured within the tube.

8. A stove as claimed in claim 7, wherein the aperture in the stove top is located at the centre of a burner pan.

9. A stove as claimed in claim 8, wherein the aperture in the upper wall of the oven liner is defined by a low upstanding peripheral wall over which the lower end of the tube fits, said wall being provided with inwardly extending tabs for reception of the catalytic oxidation element.

10. A catalytic oxidation unit substantially as hereinbefore described with reference to an as illustrated in the accompanying drawings.

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1,204,423

COMPLETE SPECIFICATION

1 SHEET

This drawing is a reproduction of the Original on a reduced scale.

FIG. 2

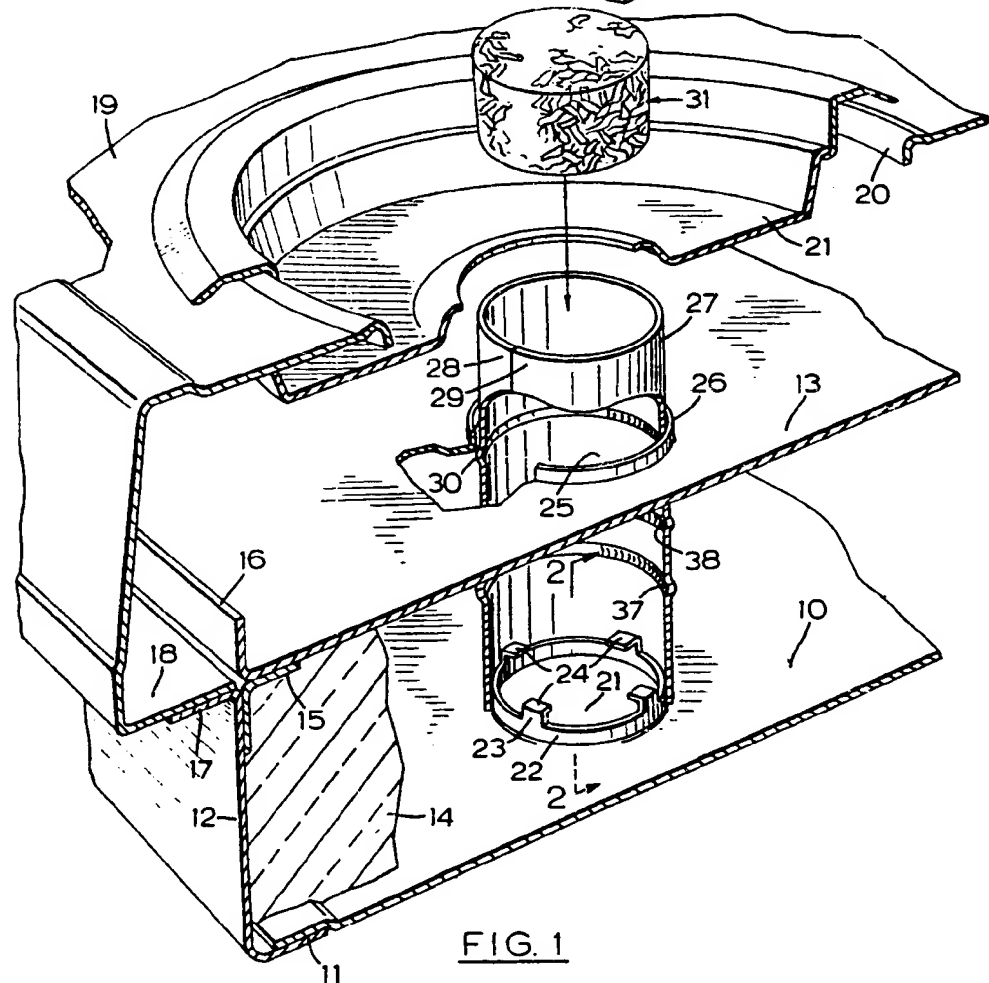
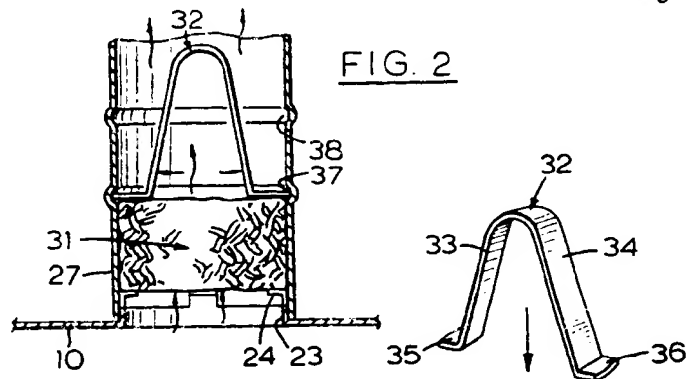


FIG. 1